Synthesis and Spectral Characterization of Photoswitchable Oligo(p-phenylenevinylene)s -Spiropyran Dyad

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2. Absorption and fluorescence emission spectra of SP(11) and corresponding MC and MCH form of SP (11) in film.

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4. Absorption and fluorescence emission spectra of OPV(7) film onto quartz substrate as well as in ACN solution.

5. Fluorescence behaviour of 2:1 SP(11) and OPV(7) mixture in ACN.

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9. 1H NMR spectra of SP-OPV-SP (10)

10. 13C NMR spectra of SP-OPV-SP (10)
Figure 1S. (a) Black colour curve, absorption spectra of SP(11) in ACN, (b) magenta colour curve, absorption spectra of SP(11) after Uv irradiation ($\lambda_{irr}$ =350nm) for 10 minutes, effectively shows the absorption spectra of MC form of SP(11) in ACN, (c) dark yellow colour curve, absorption spectra of SP(11) after Uv irradiation ($\lambda_{irr}$ =350nm) for 10 minutes followed by addition of CF$_3$COOH, effectively shows the absorption spectra of MCH form of SP(11) in ACN, (e) blue colour curve, fluorescence emission spectra of SP(11) after Uv irradiation ($\lambda_{irr}$ =350nm) for 10 minutes in ACN, effectively shows the emission spectra of MC form of SP(11) in ACN, Emission spectra was collected on excitation at 580 nm., (f) Orange colour curve, fluorescence spectra of SP(11) after Uv irradiation ($\lambda_{irr}$ =350nm) for 10 minutes followed by addition of CF$_3$COOH, effectively shows the fluorescence spectra of MCH form(if any) of SP(11) in ACN, Emission spectra was collected on excitation at 580 nm.
Figure 2S. (a) Black colour curve, absorption spectra of SP(11) in cast film, (b) magenta colour curve, absorption spectra of SP(11) after Uv irradiation (λ_{irr} =350nm) for 10 seconds, effectively shows the absorption spectra of MC form of SP(11) film, (c) dark yellow colour curve, absorption spectra of SP(11) after Uv irradiation (λ_{irr} =350nm) for 10 seconds followed by addition of CF₃COOH, effectively shows the absorption spectra of MCH form of SP(11) film, (e) blue colour curve, fluorescence emission spectra of SP(11) after Uv irradiation (λ_{irr} =350nm) for 10 seconds in film, effectively shows the emission spectra of MC form of SP(11) film, Emission spectra was collected on excitation at 580 nm., (f) Orange colour curve, fluorescence spectra of SP(11) after Uv irradiation (λ_{irr} =350nm) for 10 seconds followed by exposure to CF₃COOH vapour, effectively shows the fluorescence spectra of MCH form(if any) of SP(11) film, Emission spectra was collected on excitation at 580 nm. Film was prepared from DCM solution of (~ 2-5 mM) SP(11). A few drops of as prepared DCM solution was placed over clean quartz surface and allowed to dry at ambient condition before use the film for spectroscopic studies.
Figure 3S. SEM image of SP-OPV-SP (10).

Figure 4S. (a) Black colour curve, absorption spectra of OPV(7) in ACN, (b) blue colour curve, absorption spectra of OPV(7) in cast film, (c) Orange colour curve, fluorescence spectra of OPV (7) in ACN $\lambda_{EX}=350$ nm, (d) megenta colour curve, fluorescence spectra of OPV (7) in cast film $\lambda_{EX}=375$ nm.

Film was prepared from DCM solution of (~ 1-3 mM) OPV(7). A few drops of as prepared DCM solution was placed over clean quartz surface and allowed to dry at ambient condition before use the film for spectroscopic studies.
Figure 5S. (a) Black colour curves, absorption and emission spectra of 2:1 SP(11) and OPV(7) mixture in ACN, \( \lambda_{\text{EX}} = 350 \text{ nm} \). (b) Magenta colour curves absorption and emission spectra of 2:1 SP(11) and OPV(7) mixture in ACN after 330 nm irradiation for 10 minutes, \( \lambda_{\text{EX}} = 350 \text{ nm} \).

Figure 6S. Concentration dependent fluorescence quenching efficiency of SP-OPV-SP (10) after 350 nm Irradiation for 10 minutes. (A) 5, (B) 10, (C) 30 and (D) 55 \( \mu \text{ M} \) concentration of SP-OPV-SP (10) respectively. Photostationary state between SP-OPV-SP (10) and MC-OPV-MC is found to be independent of concentration for 10-55 \( \mu \text{ M} \) concentration range.
Irradiation wavelength dependent fluorescence quenching efficiency of SP-OPV-SP(11) (10 μM) in ACN solution. Irradiation wavelength (A) 300, (B) 330, (C) 350 and (D) 375 nm respectively. Fluorescence spectra were collected on 415 nm excitation where SP has very weak absorbance. Irradiation above 350 nm yield less fluorescence quenching ie. less conversion efficiency from SP-OPV-SP to MC-OPV-MC. It is obvious, as SP have very weak absorbance above 350 nm.

Excitation wavelength dependent fluorescence quenching efficiency of SP-OPV-SP(11) (~30 μM) in ACN solution. Excitation wavelength (A) 300, (B) 330, (C) 350 and (D) 375 nm respectively. UV Irradiation was for 10 minutes with wavelength 350 Fluorescence quenching ie. conversion efficiency from SP-OPV-SP to MC-OPV-MC was found to be independent of excitation wavelength.
NMR Spectra of SP-OPV-SP (10):

Figure 9S. $^1$H NMR spectrum of SP-OPV-SP (10) in CDCl$_3$.

Figure 10S. $^{13}$C NMR spectrum of SP-OPV-SP (10) in CDCl$_3$. 